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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,249	02/19/2004	John L. Fulton	14138-B	1416

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EXAMINER	
BLAN, NICOLE R	
ART UNIT	PAPER NUMBER
1792	
MAIL DATE	DELIVERY MODE
03/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/783,249	FULTON ET AL.	
	Examiner	Art Unit	
	NICOLE BLAN	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3,5-8,12,16-23,26,27,29,31,32,40,42-44 and 71-83* is/are pending in the application.

4a) Of the above claim(s) *3,5-8,12,16-23,26,27,29,31,32,40 and 42-44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *71-83* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendments to the specification, the cancellation of claims 45-70, and the addition of new claims 71-83 filed on December 12, 2007 have been acknowledged.

2. The rejection over claim 53 under 35 U.S.C. §112, second paragraph is withdrawn due to the cancellation of the claim.

3. The Examiner is withdrawing the double patenting rejection in view of the cancellation of claims 50-70.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 72-77 and 79-80 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 72: Applicant states "…encapsulating said complex within a structure prior to…". It is unclear what the applicant is trying to claim. What are the structural limitations required for "a structure"?

Claims 73-77 and 79-80 are rejected over their dependency from claim 72.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 71-74, and 76-82 are rejected under 35 U.S.C. 102(e) as being anticipated by DeYoung et al. (U.S. PGPub 2003/0033676, hereafter '676).

Claims 71-74 and 76-78: '676 teaches a process for chemically removing a residue from a surface [page 10, paragraph 116, lines 1-5] by applying a densified fluid [page 4, paragraph 56, lines 16-21; page 10, paragraph 117] mixed with surfactant(s) [reads on "micelle" in claim 73 and "reverse micelle" in claim 74; page 4, paragraphs 58 and 61; page 5, paragraph 68; pages 5-6, paragraph 69; page 10, paragraph 117], co-solvents, such as amines [reads on claim 76 and 78; pages 4-5, paragraphs 63-65; page 10, paragraph 117], and water [reads on "pre-selected chemical reagent" in claim 71 and "chemical reagent" in claim 77; page 10, paragraph 117] and applying the detergent to the substrate to remove unwanted residues [page 4, paragraph 56, lines 16-21; page 10, paragraph 117]. '676 teaches the same manipulative steps as used in the instant specification for creating the cleaning solution for removing the residue from the surface of the substrate. It is merely the steps of mixing of the components together to form a reactive detergent for removing residues from the substrates. Therefore the selection of any order of

performing process steps is prima facie obvious in the absence of new or unexpected results. *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

Claims 79-80: '676 also teaches chemically removing transition metal residues, such as copper, from a surface [page 10, paragraph 114, lines 1-3 discusses removing low-k dielectric eth residues; page 9, paragraph 113, lines 6-8 states it can be copper].

Claim 81: '676 teaches the limitations of claim 71 above. '676 also teaches rinsing the substrate with densified carbon dioxide and repeating as desired [page 9, paragraph 107, lines 12-19]. '676 does not explicitly teach rinsing between 2 and 5 times. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the number of rinsing steps needed to ensure complete removal of the detergent from the substrate, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claim 82: '676 teaches the limitations of claim 71 above. '676 does not explicitly teach how long the substrate is contacted by the chemical reagent. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the contact time of the reagent based on the thickness of the residue to be removed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

9. Claims 75 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over '676, in view of Joyce et al. (U.S. Patent 6,764,552, hereinafter '552), and further in view of DeYoung et al. (U.S. PGPub 2004/0071873, hereinafter '873).

Claims 75 and 83: '676 teaches the limitations of claims 72 and 71, respectively, above. '676 teaches that a temperature below 31°C can ensure that CO_2 remains densified [pages 7-8, paragraph 92], that a fluorocarbon-based surfactant can be used [page 5, paragraph 68; lines 14-15], and that at least one reagent is an amine [alkanolamine; page 5, paragraph 65, lines 1-2 and 21-22].

'676 does not teach the specific temperatures or pressures claimed. However, '552 teaches that the critical temperature and pressure for carbon dioxide are 31.0°C and 73.9 bar [col. 5, lines 20-22]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to find the optimum values of temperature and pressure as recommended in '676 to keep the density above the critical density through routine experimentation.

'676 and '552 do not teach that the reverse micelle is PFPE ammonium carboxylate. However, '873 teaches that a perfluoropolyether surfactant such as perfluoropolyether ammonium carboxylate can be mixed with CO_2 to remove etch residues from semiconductor wafers [page 7, paragraph 82; page 7, paragraph 83, lines 4-7]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the surfactant of '873 as the surfactant of '676 because '873 teaches that PFPE surfactants combined with supercritical CO_2 removes etch residue from semiconductors. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the PFPE surfactants in

combination with supercritical CO_2 as taught by '873 as the surfactant of '676 with a reasonable expectation of success because '873 teaches that it will remove etch residues from semiconductors.

Response to Arguments

10. Applicant's arguments filed on December 12, 2007 have been fully considered but they are not persuasive.

In response to the applicants' argument that DeYoung does not teach the newly added limitations, the Examiner respectfully disagrees. DeYoung teaches the same manipulative steps as used in the instant specification for creating the cleaning solution for removing the residue from the surface of the substrate. It is merely the steps of mixing of the components together to form a reactive detergent for removing residues from the substrates. Therefore the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE BLAN whose telephone number is (571)270-1838. The examiner can normally be reached on Monday - Thursday 8-5 and alternating Fridays 8-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. B./
Examiner, Art Unit 1792

/Alexander Markoff/
Primary Examiner, Art Unit 1792